

Operation Guide

Marksman MRAMS V6.04

System Configuration



Before any activity is carried out on the equipment, it is recommended that the included Sonardyne Safety Manual and all warnings and cautions in this and the equipment manual(s) are read and fully understood.

It is recommended the operator complies with the Health and Safety Regulations applicable to the vessel and the region before operating this equipment.

Operators and service personnel must be familiar with the normal operating and safety procedures for subsea equipment.

Documentation must be consulted whenever a  or  warning symbol is found on the equipment, in order to determine the nature of the potential hazard and any actions which must be taken.

If any additional equipment is used, any warnings and cautions in the equipment user manual must be read and fully understood and the equipment must only be used as specified by the manufacturer.

The safety of any system incorporating this equipment is the responsibility of the assembler of the system.

PRODUCT SUPPORT: Email: support@sonardyne.com Telephone: +44 1252 872288

24 Hour Emergency Helpline: +44 1252 877600

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Related Publications

For more information on Marksman, refer to the following user manual:

- *UM-8250 "Marksman L/USBL User Manual"* (included with Marksman)

Product Support Videos

Visit the Sonardyne YouTube channel for additional advice on using Marksman.

DPTi Transponder

In order to use the MRAMS option it is necessary to have two Sonardyne DPTi transponders installed:

- One attached to the Riser (usually on the Lower Flex Joint).
- One attached to the BOP (or LMRP).

Note



Contact Sonardyne Support for DPTi installation instructions and considerations.

Prior to installing the DPTi ensure that:

1. A full deck test is performed and a test report generated for future reference (for details on functional testing a transponder refer to *UM-8300 "Wideband Transponder"*).
2. The DPTi's are installed with the FORWARD mark aligned to BOP Forward to achieve accurate pitch and roll values. This also allows the system to output a course to steer where required.

Note



Ensure DPTi addresses are separated by at least two address codes (e.g. for a Riser DPTi address of 2501, addresses 2502 and 2503 should not be assigned) as these addresses will be used to transmit pitch and roll data in "pulse position mode" if required.

MRAMS Software

Ensure the latest version of the Marksman MRAMS software is installed (contact Sonardyne Support for the latest software version). For installation instructions, refer to *UM-8250 "Marksman L/USBL User Manual"*.

Ensure all sensors have been interfaced into the Marksman MRAMS system and that all relevant status indicators are green in the lower left window of the Marksman MRAMS software.



Note



GNSS is only necessary if real world coordinates are required.

Hardware

Ensure the MRAMS hardware has been fully commissioned and confirmed to be functioning correctly.

BOP Deployment

Setting to work of the Marksman MRAMS system requires the BOP to have been deployed to a depth of approximately 50 m.

Adding a DPTi Transponder

Introduction

This Guide explains how to set up the Marksman MRAMS system (for more information, refer to *UM-8250 "Marksman L/USBL User Manual"*).

Adding a DPTi Transponder to the Job

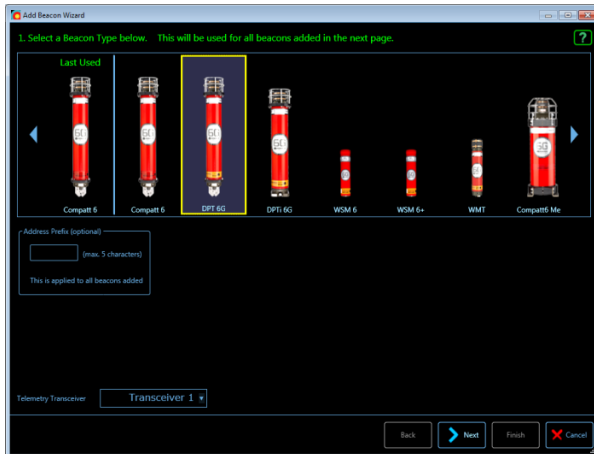
1. Open the beacon table by clicking the **Beacons** button.



2. Click **Add**.



3. Select and click **DPTi 6G** and then click **Next**.



Adding a DPTi Transponder

4. Select the addresses of both DPTi 6G transponders being used.

2. You can add several DPTi 6G beacons in one go by selecting address cells below.

WB1 WB2 WB2+

Wideband 2 is the default for 6th Generation (6G) instruments

1701	1801	1901	2001	2101	2201	2301	2401	2501	2601	2701	2801	2901	3001	3101
1702	1802	1902	2002	2102	2202	2302	2402	2502	2602	2702	2802	2902	3002	3102
1703	1803	1903	2003	2103	2203	2303	2403	2503	2603	2703	2803	2903	3003	3103
1704	1804	1904	2004	2104	2204	2304	2404	2504	2604	2704	2804	2904	3004	3104
1705	1805	1905	2005	2105	2205	2305	2405	2505	2605	2705	2805	2905	3005	3105
1706	1806	1906	2006	2106	2206	2306	2406	2506	2606	2706	2806	2906	3006	3106
1707	1807	1907	2007	2107	2207	2307	2407	2507	2607	2707	2807	2907	3007	3107
1708	1808	1908	2008	2108	2208	2308	2408	2508	2608	2708	2808	2908	3008	3108
1709	1809	1909	2009	2109	2209	2309	2409	2509	2609	2709	2809	2909	3009	3109
1710	1810	1910	2010	2110	2210	2310	2410	2510	2610	2710	2810	2910	3010	3110
1711	1811	1911	2011	2111	2211	2311	2411	2511	2611	2711	2811	2911	3011	3111
1712	1812	1912	2012	2112	2212	2312	2412	2512	2612	2712	2812	2912	3012	3112
1713	1813	1913	2013	2113	2213	2313	2413	2513	2613	2713	2813	2913	3013	3113
1714	1814	1914	2014	2114	2214	2314	2414	2514	2614	2714	2814	2914	3014	3114

(USBL) ← Longer Range High Elev. USBL* USBL → (USBL)

Key:
 Already in use
 Recommended for Pulse Position Mode
 Addresses not recommended
 Clear

On finish, perform the following action:
 ☐ Get None ☐ Get Beacon Identity ☒ Get All Beacon Parameters

Back Next Finish Cancel

Note

DPTi addresses must be at least two addresses apart to allow for pitch and roll data to be transmitted via “pulse position mode”.

5. Click the **Get All Beacon Parameters** option and then click **Finish**.

2. You can add several DPTi 6G beacons in one go by selecting address cells below.

WB1 WB2 WB2+

Wideband 2 is the default for 6th Generation (6G) instruments

1701	1801	1901	2001	2101	2201	2301	2401	2501	2601	2701	2801	2901	3001	3101
1702	1802	1902	2002	2102	2202	2302	2402	2502	2602	2702	2802	2902	3002	3102
1703	1803	1903	2003	2103	2203	2303	2403	2503	2603	2703	2803	2903	3003	3103
1704	1804	1904	2004	2104	2204	2304	2404	2504	2604	2704	2804	2904	3004	3104
1705	1805	1905	2005	2105	2205	2305	2405	2505	2605	2705	2805	2905	3005	3105
1706	1806	1906	2006	2106	2206	2306	2406	2506	2606	2706	2806	2906	3006	3106
1707	1807	1907	2007	2107	2207	2307	2407	2507	2607	2707	2807	2907	3007	3107
1708	1808	1908	2008	2108	2208	2308	2408	2508	2608	2708	2808	2908	3008	3108
1709	1809	1909	2009	2109	2209	2309	2409	2509	2609	2709	2809	2909	3009	3109
1710	1810	1910	2010	2110	2210	2310	2410	2510	2610	2710	2810	2910	3010	3110
1711	1811	1911	2011	2111	2211	2311	2411	2511	2611	2711	2811	2911	3011	3111
1712	1812	1912	2012	2112	2212	2312	2412	2512	2612	2712	2812	2912	3012	3112
1713	1813	1913	2013	2113	2213	2313	2413	2513	2613	2713	2813	2913	3013	3113
1714	1814	1914	2014	2114	2214	2314	2414	2514	2614	2714	2814	2914	3014	3114

(USBL) ← Longer Range High Elev. USBL* USBL → (USBL)

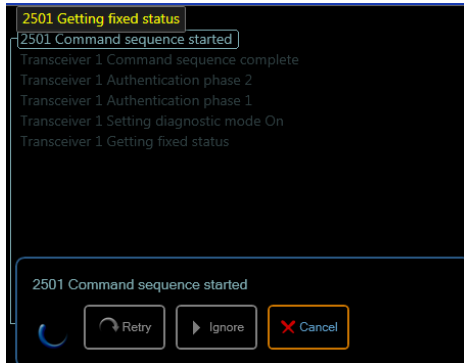
Key:
 Already in use
 Recommended for Pulse Position Mode
 Addresses not recommended
 Clear

On finish, perform the following action:
 ☐ Get None ☐ Get Beacon Identity ☒ Get All Beacon Parameters

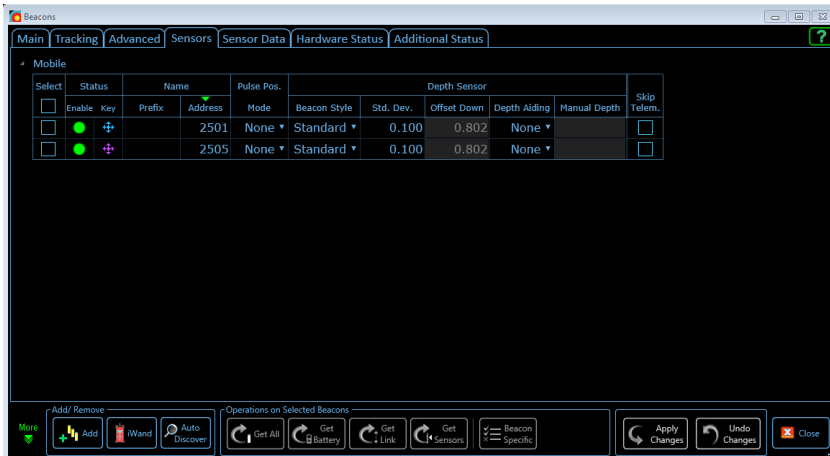
Back Next Finish Cancel

Adding a DPTi Transponder

6. Monitor the comms window in the lower left and ensure that the command sequence starts.

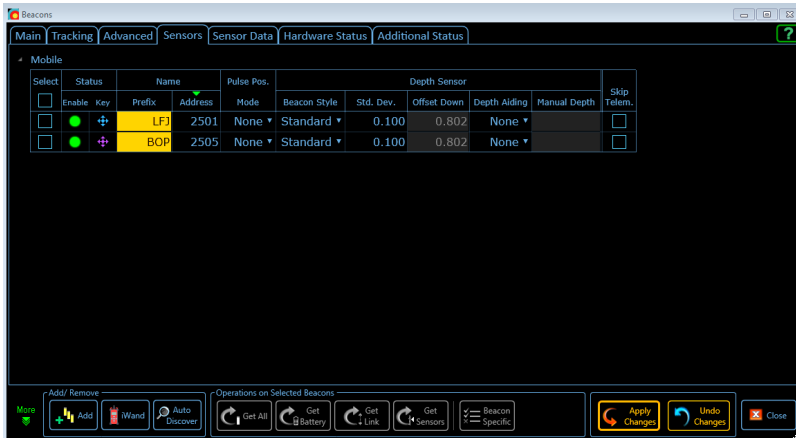


7. Ensure that both transponders report **Command Sequence Complete**.
8. Check that the beacon table is now populated with the two DPTi transponder addresses.



Frequency Management

9. Add a prefix of **LFJ** (or **Riser**) and **BOP** to the transponders for clarity.



10. Click **Apply Changes** to save the prefixes.

Frequency Management

Each Sonardyne Wideband transponder is programmed to be interrogated on a Common Interrogation Signal (CIS) as well as an Individual Interrogation Signal (IIS). To increase battery life of the transponders it is advised to separate the CIS for the MRAMS DPTi's from those of other subsea transponders.

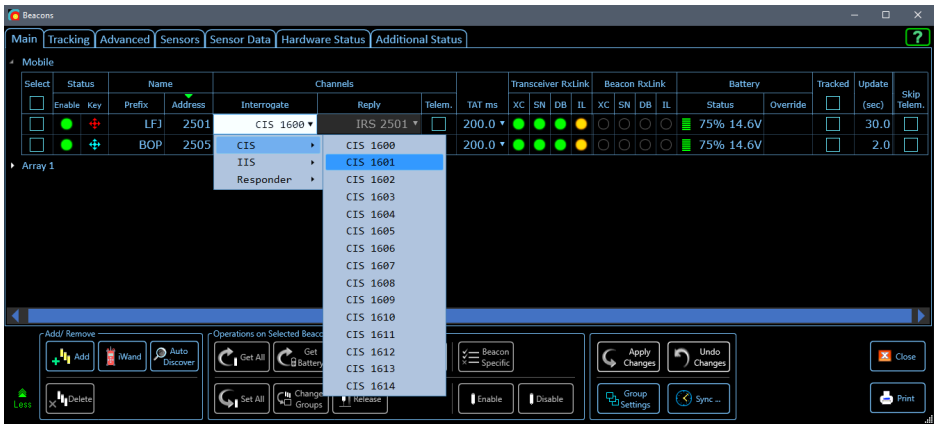
1. Open the beacon table by clicking the **Beacons** button.



2. Click the **Interrogate** column associated with the Riser MRAMS transponders to open the selection options.
3. Expand the **CIS** list.

Acoustically Tracking the DPTi

4. Select a CIS that is not used by any other transponder.



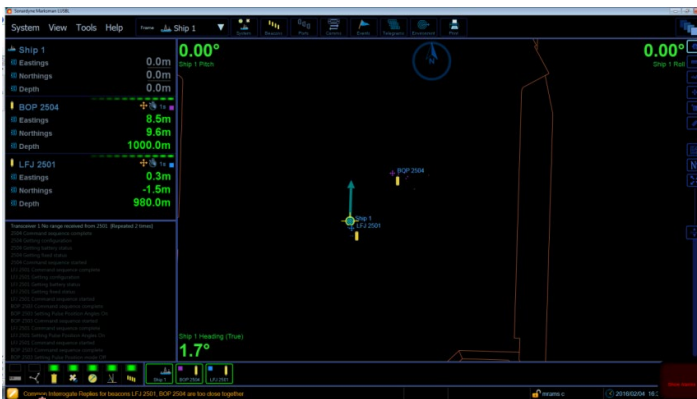
- Click **Apply Changes** to save the CIS.
- Ensure that the transponder reports **Command Sequence Complete**.

Acoustically Tracking the DPTi

1. To track the transponders, click both DPTi beacon target selection buttons on the lower window.



2. Check that the positions are stable as displayed on the left tracking pane.
3. Check that the BOP transponder is deeper than the Riser transponder as displayed on the left tracking pane.



Configuring the Acoustic Data Link

Configuring the Acoustic Data Link

The Marksman MRAMS system can recover data acoustically using two methods; Pulse Position Mode and Telemetry. To maximise battery life the following actions are recommended:

Pulse Position Mode sends back multiple replies of 8 ms duration (for Wideband 1 and Wideband 2 addresses) to the same CIS interrogation, with the time difference between each pulse representing respective roll and pitch data. The transponder must be tracked as a mobile beacon for Pulse Position Mode to be enabled.

Telemetry replies consist of an encoded data packet of 640 ms duration (using the default "RTS1" Reply Telemetry Scheme).

- If an update of less than 15 minutes is required, it is recommended to use **Pulse Position Mode**.
- If an update rate greater than 15 minutes is required, it is recommended to use **Telemetry**.

Note



It is normal practice to set the **BOP** to **Telemetry** and the **Riser LFJ** to **Pulse Position Mode**.

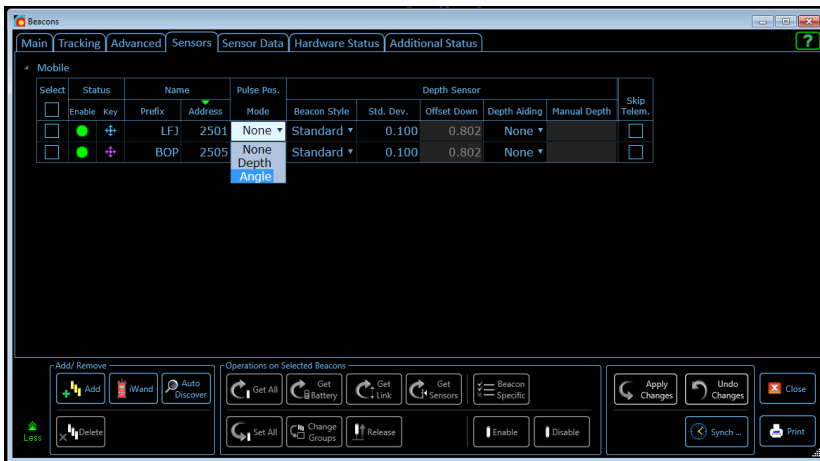
Configuring Pulse Position Mode

Configuring Pulse Position Mode

1. Open the beacon table by clicking the **Beacons** button.



2. Click the **Sensors** tab.
3. On the **Pulse Pos. Mode** drop-down list, select **Angle** for the required transponder.



4. Click **Apply Changes** to save the settings and acoustically command the transponder to operate in **Pulse Position Mode**.
5. Monitor the comms window and ensure **Command sequence complete** is displayed to confirm that the transponder has been correctly configured.

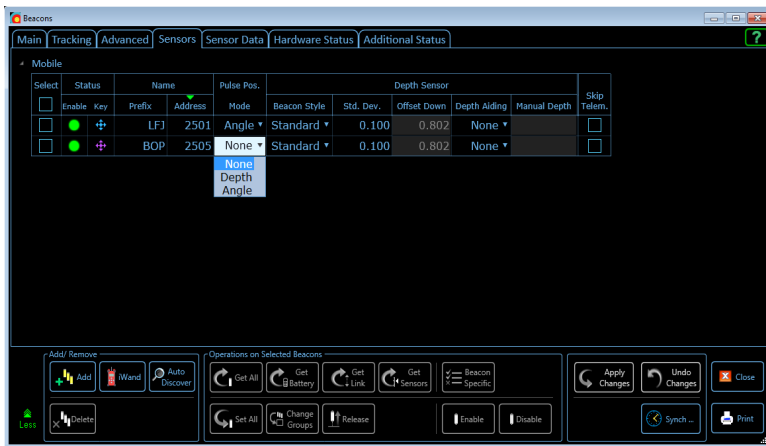
Configuring Telemetry Mode

Configuring Telemetry Mode

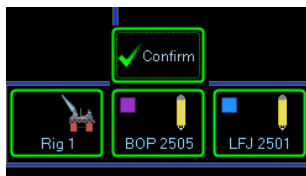
1. Open the beacon table by clicking the **Beacons** button.



2. Click on the **Sensors** tab.
3. On the **Pulse Pos. Mode** drop-down list, select **None** for the required transponder.



4. Close the **Beacons** window.
5. Stop tracking any transponders that will update via telemetry; on the target selection window, click the transponder and then click **Confirm**.



6. The transponder will no longer be outlined in green.



MRAMS Software Configuration

1. Click **Tools > MRAMS**.
2. Click **Configure** to display the **MRAMS Configuration** dialog box.
3. Select the transponder that is assigned to the BOP on the **BOP** pane, **Beacon** drop-down list.
4. Select the transponder that is assigned to the Riser on the **LFJ** pane, **Beacon** drop-down list.
5. If using telemetry enter the required **Update Period** in seconds.
6. Click **OK**.

Note



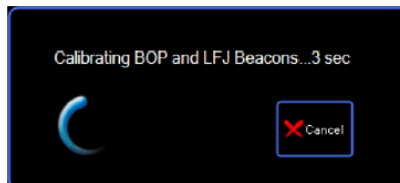
When using Pulse Position Mode, set the **Update** rate on the **Beacons** table, **Main** tab.

7. Leave **Pitch** and **Roll** offsets at zero.
8. If it is necessary to generate alarms when the difference between the BOP attitude and the Riser attitude exceeds defined limits; on the **General** pane:
 - Select the **Raise Warning Alarm when** check box and enter an angular alarm limit in degrees.
 - Select the **Raise Critical Alarm when** check box and enter an angular alarm limit in degrees.
9. Select the **Enable MRAMS** check box to enable the automatic MRAMS function.
10. Click **OK** to accept changes and close the **MRAMS Configuration** dialog box.

MRAMS Calibration

To calibrate the BOP and Riser attitudes, the BOP should be suspended in the water under the vessel at a depth where there is a clear line of sight between the transceiver and the transponders.

1. Click **Tools > MRAMS**.
2. Click **Configure** to open the **MRAMS Configuration** dialog box.
3. Clear the **Enable MRAMS** check box to enable the **Calibrate Using New Data** button.
4. Click **Calibrate Using New Data**.



5. When the measurement completes, the software displays the results on the **MRAMS Configuration** dialog box.

6. Click **OK** to accept the new offsets and close the **MRAMS Configuration** dialog box.

Bop Heading

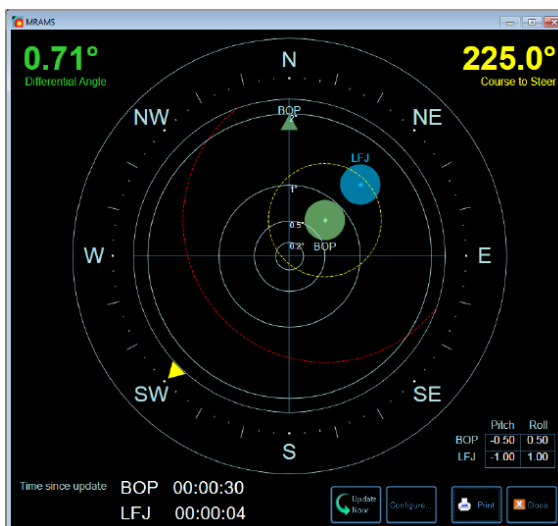
The BOP can now be lowered to the seabed and connected to the well head. After the BOP is connected, enter the BOP heading so that it can correctly calculate the course to steer for the vessel:

1. Click **Configure** to open the **MRAMS Configuration** dialog box.
2. Type the heading of the BOP into the **BOP Heading** box.
3. Click **OK** to accept the new heading and close the **MRAMS Configuration** dialog box.

MRAMS Window

The centre of the MRAMS window contains a bullseye that shows the angles of the BOP and the Riser, with a green arrow to indicate the BOP heading as entered in the MRAMS Configuration dialog box. The dotted red and yellow circles at the centre of the window show the Warning and Critical alarm limits. The small yellow arrow and the yellow data field at the top right-hand corner of the screen indicate the Course to Steer.

- The top left-hand reading indicates the differential angle between the BOP and the Riser.
- The bottom right-hand reading indicates the pitch and roll of both the BOP and the Riser.



MRAMS Output Telegram

A DP telegram carrying MRAMS data can be added. The usual choice of HPR309, 418 (or 418BCD) or SSB depends on the DPS configuration, but note that these telegrams require the LFJ beacon to be tracked in Pulse Position Angle mode.

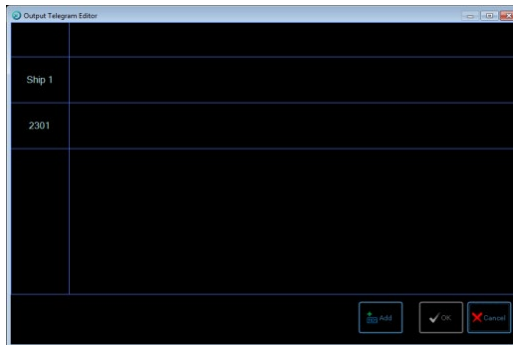
The Sonardyne PSNMRAMS telegram can also be used. This has the advantage that it does not need the system to be tracking a beacon.

To add an output telegram:

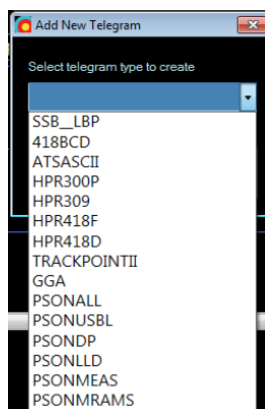
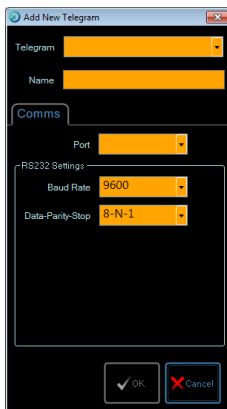
1. Click the **Telegrams** button.



2. Click **Add**.



3. Select a telegram type from the **Telegram** drop-down list.
4. Select the appropriate **Port** and **Baud Rate** for the output telegram and then click **OK**.



MRAMS Output Telegram

5. Select the **Enable** check box for the Riser beacon and then click **OK**.

Output Telegram Editor

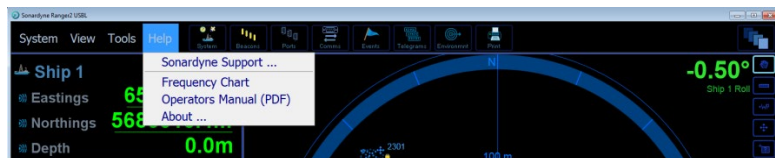
Name	Type	Port	Enable	Index	Frame of Reference	Orientation	Filtered
Rig 1	418BCD1	COM12	☐				
BOP 2505			☐				
LFJ 2501			☒	1	Rig 1	Bow Up	☐

+ Add OK Cancel

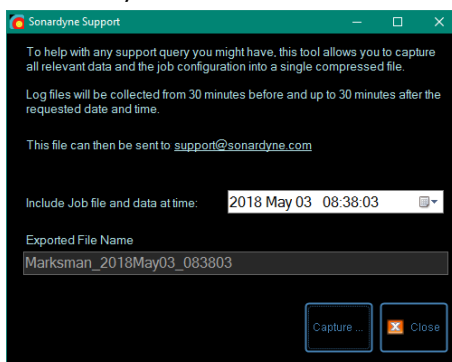
6. The output telegram will now carry the MRAMS differential pitch and roll data each time the Riser position updates.

Sonardyne Support

If any difficulties or problems are encountered when attempting to operate the Marksman MRAMS system, click **Help > Sonardyne Support**.



1. Select the date and time the event occurred and then click **Capture**.
2. Browse to the desired folder for the output file and then click **OK**.
3. A support log file will be created containing logged data from 30 minutes before to 30 minutes after the target time. The support log file can be sent to Sonardyne Support for analysis.



Term	Definition
6+	Sonardyne instruments that can use Wideband 3 enabling sensor data to be embedded in navigation range replies e.g. Compatt 6+ 6+ instruments are also backward compatible with Wideband 2.
6G [®]	Sonardyne's sixth generation technology hardware platform
Beacon (Acoustic)	An instrument that emits acoustic signals. Common beacon types are: Transponder, Responder and Pinger.
BOP	Blow Out Preventer
CIS	Common Interrogation Signal
DPS	Dynamic Positioning System
DPTi	Dynamic Positioning Transponder with Inclometers (MRAMS Transponder)
LFJ	Lower Flex Joint of Riser
LMRP	Lower Marine Riser Package
MRAMS	Marine Riser Angle Monitoring System
Sonardyne	Sonardyne International Limited and its affiliates
Sonardyne Wideband [®] 2	6G [®] transponders and transceivers use Sonardyne Wideband [®] 2 ultra-wide bandwidth signals giving faster and more robust transmission of data, more precise ranging and mitigation from multipath in shallow water and amongst steel structures in deep-water
Sonardyne Wideband [®] 3	Telemetry protocol available with 6G "+" devices that enables sensor data to be embedded in navigation range replies

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